IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Donald Bruce McDugle	Art Unit:	3617
Serial No.	10/726,465	Examiner:	
Filed:	December 02, 2003	Cust. No.	22931
For:	BOAT THRUSTER APPARATUS AND METHOD	Attorney Ref. No.:	P114519

MAIL STOP Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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September 8, 2004
Date
Carole Petrelli
Carole Petrelli

DECLARATION

I, Donald Bruce McDugle, having a home address of 1319 15th Street, Anacortes, Washington 98221, state and aver the following:

1. I am one of the co-inventors in the above noted patent application, namely U.S. Patent Application S.N. 10/726,465, entitled "Boat Thruster Apparatus and Method", filed on December 2, 2003. This application claims the benefit of an earlier provisional application, containing substantially the same subject matter as in the later above noted patent application, this provisional application having been filed on December 6, 2002.

2. I have been asked by Mr. Robert Hughes, who is the patent attorney who has prepared both the provisional application

noted above also the follow on nonprovisional application (U.S. Serial Number 10/726,465) to provide information relating to activities relating to the above noticed provisional application and a follow on nonprovisional application. More specifically, I have been asked by Mr. Hughes to provide information concerning events which occurred prior to December 6, 2001, which is one year prior to the filing of the provisional application on December 6, 2002 and also to related events occurring after December 6, 2001.

3. I have been employed by Cap Sante Marine Ltd. since approximately Sept. 16, 1992 (give date or approximate date). During my employment at Cap Sante Marine Ltd., I have been engaged in a variety of activities, such as

Fiberglass repair tech.
Fiberglass shop Foreman
Bid and estimate writer
Research and develop-ment
Crew training
Speaker and boat shows/rendezvous

(summarize briefly the nature of your work such as installing different equipment, trouble shooting, etc.).

4. For at least the last twenty years, part of my work has been related to "side thrusters", which are used in boats and are

commonly referred to as "thrusters". These thrusters are placed in the water adjacent to the stern of the boat, and they produce thrust laterally in both directions so that when the boat is either stationary in the water or travelling forwardly at a slow speed, the stern of the boat can be moved to one side or the other by means of the thruster. Because of my work activities related to thrusters over the years, I have acquired in this industry a reputation of having expertise in this area.

5. If the draft of the boat is sufficiently deep, the thruster can be mounted at a stationary position on the stern of the boat. Thus, when the boat is travelling forwardly at a higher velocity, the thruster will be out of the water stream. However, if the draft of the boat is relatively shallow, the positioning of the thruster would have to be at a sufficient depth in the water so that when the boat was traveling at higher speeds, the thruster would remain in the water. Therefore, there have been thruster designs where the thruster is moveable from a lower deployed position at which the thruster is operated, and an upper position so that the boat can travel forwardly through the water without having the thruster being immersed in the water.

6. These thrusters which are moved between positions out of the water and under the water are rather expensive. Accordingly over the last several years I have been thinking of ways to eliminate the need for lifting the thruster out of the water. One of the concepts which I came up with some time prior to

December, 2001, is providing a thruster that had the center part of the thruster at a relatively high location at the stern of the boat, and then at the two sides of the center member of the thruster, there would be oppositely positioned horn shaped water inlet/outlet tubes which would extend from the side inlet portions of the central portion of the thruster laterally, then at a downward slant, and then at a lateral slant. This configuration can also be called a "lazy S". The thruster should be positioned so that the inlet/openings are at a sufficient depth below the water. The reason for this is that if the inlet/outlet opening is to close to the water surface, as the water flows into the inlet/outlet opening, air will be entrained in the water and the thrusting force would be substantially reduced. The lazy S-shaped attachment would in the operation position be located so that its outer side inlet/outlet openings would be at a lower position in the water. Then when the boat is traveling forwardly at a higher speed, the two attachments would be rotated 180 degrees so that the laterally outward part of the attachment would be out of the water.

7. In the later part of the summer of 2001 (e.g. on or about September), Mr. Robert Murch came to see me at Cap Sante Marine Ltd., and we met in my office at Cap Sante Marine Ltd. He told me that I have been referred to him by one or more sources as someone who had expertise in the subject of thrusters for boats. He wanted a stern thruster for his boat, which was a 37 foot Nordic tug. I told him about some of

my ideas about how a thruster could be possibly be installed on a boat such as his (the boat has a rather shallow draft). I discussed with him my concept of the horn shaped device (described above and also referred to as the "lazy S configuration"). Mr. Murch was not too enthused about that. I also discussed with him another possible configuration which was what I call a "shroud" or "shield" which would have a connecting end extending about half way around the inlet/outlet opening of the central cylindrical member and would slope downwardly and laterally outwardly, and having a interior concave surface that formed a passageway leading from a lower location upwardly at a slant and into the outlet/inlet of the central position of the thruster.

8. Then after this discussion which took place in my office, Mr. Murch and I walked down to Mr. Murch's boat and spent about 45 minutes looking at the dimensions of the boat, and how this concept might be incorporated in Mr. Murch's boat. Mr. Murch then asked me how much it would cost, and I asked him to let me take a half hour to do some calculations. I went back to my office where I could use the adding machine and came back. I gave Mr. Murch a figure of labor and materials of $9700.00. I was honest with Mr. Murch in telling him that I had not built or tried this concept on a boat, and I did not know whether or not it would work properly, work poorly or not work at all. We also agreed that whether the concept worked or not, Cap Sante Marine Ltd. would still get paid the $9700.00 for labor and

materials. Mr. Murch and I both agreed at that time that he was paying for labor and materials and if it didn't work there would be no repayment of money. It would simply be a busted experiment and Mr. Murch would simply have to take a loss. It was also recognized by both of us that it was a first prototype, and quite possibly additional work, repair or design changes may need to be made. Further, I wanted to be kept abreast of how the thruster would be operating and what the defects might be, since I would want to avoid mistakes in making a later prototype. Accordingly, we agreed that I would give him follow-up support in having the modifications made as needed, provided that he would pay at least the out of pocket expenses for parts. Accordingly, Mr. Murch wrote me a check for $1500.00 as a down payment and after that I undertook the task of constructing what I will call the "thruster assembly" which is made up of the central thruster and the two shrouds which are connected on opposite sides of the thruster housing. Work began shortly after that, and I enlisted the aid of Kevin Pattison, another Cap Sante Marine Ltd. employee, to work with me in building the thruster assembly.

9. I felt that we were very fortunate to have this opportunity to make a prototype of this design. In a project such as this, it is not simply manufacturing a piece of apparatus. Rather, it is designing the apparatus so as to be used in combination with the structure of the boat. Thus, the configuration of the apparatus and its dimensions had to be compatible so that in

the thrust mode of operation the thrust assembly needs to operate effectively within the limits dictated by the configuration of the stern in the boat and its draft at the stern. While in the cruise mode, the thrust assembly should be positioned so as not to interfere with the water stream traveling under the boat. Accordingly, I regarded this as a rare opportunity to be able to build a prototype and try it out on an actual boat. I regarded this construction of the first prototype as an experiment to find out first if it would work at all for us and secondly to ascertain its performance, and to see what adjustments could be made to improve its performance.

10. It took us about 3 weeks to complete the construction of the prototype. Attached to this declaration are two drawings which illustrate the thruster assembly which was installed as a first prototype. Reference is first made to Figs. 2 and 3. Fig. 2 is a view looking at the rear transom of the boat with the thruster assembly mounted at the lower middle part of the transom, and Fig. 3 is a side elevational view of the boat also showing the thruster assembly in its installed position. To describe briefly the main components, the boat 10 comprises a rear transom 12 and a bottom wall comprising right and left sections 16 and 18. The water level with the boat being stationary is indicated at 20. The thrust assembly 22 comprises the central thrusting portion 24 and two extension members or shrouds 26 which extend from opposite ends of the central thruster portion 22. The

central thrust portion 22 comprises a cylindrical housing in which is positioned a propeller to move the water laterally through the housing 28. Each of the shrouds or extension members 26 comprises a connecting portion which has a semi-circular configuration, indicated at 30, and a main portion 32 which extends laterally at a downward and outward slope, with a concave interior curve. This main portion being designated 32. As shown in Fig. 3, the center thrust portion 24 is positioned so that the center of the central thrust portion 24 is at about the same level as a lower midline 34 of the bottom of the boat. There is a motor 36 positioned in the lower rear portion of the boat hull, and the drive part of this motor 26 extends through the lower middle portion of the boat hull to connect to the central thrust portion 24 of the thrust assembly 22. The upper surface of the central thrust portion 24 is positioned about four inches below the water surface 20, and the lower-most surface portion of the central front thrust portion 24 w about three to four inches below the adjacent bottom surface portion of the transom, this being illustrated in Fig. 2. The outer end tips 38 of the extension members 26 are positioned at about the level of the lower wall 18 at the location of the transom 12.

11. In making this installation, there were a number of problems to be solved. Initially, I did not think that the upper surface portion of the central thrust portion 24 should be too close to the water surface, so it was placed four inches down from the water

surface. The diameter of this central thrust portion 24 was about eight inches. It was necessary to cut out the back part of the boat in the middle portion to make room for the thrust motor to connect to the central thruster portion, and we placed fiberglass and putty in that opening to plug the opening and also to properly position the thrust assembly 24. Since the central part of the thruster assembly was below the surface of the boat, we filled the area at the boats bottom and forwardly of the thruster assembly with a putty wedge to ease to flow of water downwardly and under the thruster.

12. On November 16, 2001 Mr. Murch was planning to come to Cap Sante Marine Ltd. to review the installation of the thrust assembly. Accordingly, Kevin Pattison and I took the boat into the water for a trial run. Mr. Pattison was driving the boat, and I was leaning over the back part of the hull to watch the flow of the water pass the thrust assembly 22. I observed that the water passing under the thrust assembly was adhering to the surface of the cylindrical housing 28 and it was actually turning the water in more than a 90 degree angle going upwardly and into the rear part of the boat. Mr. Pattison and I took he boat back to the dock and then as a temporary fix we glued a lip of putty (indicated at 40) extending along the rear middle portion of the cylindrical housing 28, and this deflected the water, and I fully recognized at that time that this was merely a temporary solution and would have to be fixed in some other way. Late

that afternoon, Mr. Murch arrived at the Cap Sante Marine Ltd. plant. He drove the boat in the water with us, and returned to the dock. He stated that he would take the boat as it is he paid us the amount owing to us and drove the boat away. Mr. Murch is a highly skilled mechanical engineer, and he spends much of his time on jobs in different parts of the world. Also, he is quite handy with tools and is quite capable at various hands on projects. Further, he is more of a reserved person and does a lot of thing on his own. Subsequent to that time, I made several follow-up inquiries to Mr. Murch and was not able to reach him. After about four to five months after his taking the boat, I was able to make telephone contact with Mr. Murch. I can't remember whether I called him first or if he called me first, or whether it might have been that I had called him and he was returning my call. However, he had problems in several areas. He was having trouble with moisture in the bottom part of the hull and also trouble with the motor. I had indicated what I thought the problems were, and I ordered the parts that I felt would be necessary to make the necessary repairs. I believe we rebuilt the motor at least twice. My personal point of view was that I wished that after our initial trial run he had not decided to take the boat himself. I would have liked to have kept the boat with the thruster for at least a short time so that I could make some adjustments or modifications which I felt possibly be needed.

13. On or about (insert date 12/19/01), another Nordec tug owner came to me with a stern thruster request and we agreed on a price to make and install our thruster assembly. Several adjustments were made from the first prototype. Also, it was beneficial that we had substantially the same design of a boat to work on the second time around. One adjustment that was made was that the thrust assembly was moved upwardly about two inches closer relative to the bottom surface at the stern. However, the central thrust portion still protruded a short distance below the lower surface of the bottom of the boat, and thus was in the flow stream beneath the boat. Accordingly, it was still necessary to place the fiberglass/putty wedge on the bottom of the boat forwardly of the thrust assembly to streamline the flow. It turned out, we had not totally resolved the problem of the water flowing upwardly in a curve around the rear surface the thrust housing, so we took steps to isolate the thrust motor from the water. Also, the original contour of the extension members was that these were cut from a cylindrical pipe section, and thus there was an abrupt 30 degree angle connection to the central housing of the central thrust portion 24. This was modified by making the lower concave surface of these extension members in more of a regular circular configuration10.

14. We were able to measure the performance of this second prototype in an indirect way by determining how rapidly it could

move the rear of the boat laterally. It was clear that there was a definite improvement in the thrusting ability over our first prototype. Further, based upon our observations of the water flow, there was not any ingestion (or at most a very significant ingestion) of ambient air. All of the transactions involving this second prototype occurred after December 6, 2001. However, I did not regard this as a design ready for implementation as an end product, but essentially a handmade one of a kind prototype which would quite possibly require modifications.

15. On or about Feb 2003 a 42 foot Nordec tug owner contacted me to provide him with one of our thrust assemblies. In constructing this third prototype, based upon what we learned from making the first two prototypes, we moved the thrust assembly further up the transom so that in the cruise mode the lower part of the central housing portion was not at all in the water-stream. This had at least two benefits. First, it solved the problem of the water flow during cruise adhering to the bottom and back curved surface of the housing for the central thrust portion so that we had no need for the deflecting lip. Further, the aesthetics of the uninterrupted flow stream of the wake surface passing from beneath the boat was a substantial advantage. Also, it was observed that there was no deterioration in the ability of the thrust assembly to function to provide the full thrust.

16. After building and testing this third prototype, I believe we were at a stage where we were very close to having a commercial product. Then we made a fourth prototype and in this instance, we added a laterally extending flange having a width dimension of about one inch around the perimeter of the two extensions. We found that this made an improvement in the flow pattern of the water so that there was less pressure loss and less turbulence in the water entering into the partial passageways defined by the extensions. In observing the water flow, this laterally extending perimeter flange would split the water flow in a manner so that the water above the flange would flow more easily over the extensions and the water below the flange would flow more evenly into the partial passageways provided by the extensions. We ascertained that there was a definite increment of increase in the thrust. Overall, during the development stage beginning with the original prototype that we made and ending with the fourth prototype, in observing the ability of the boat to move laterally by means of the thrust assembly, I am reasonably confident in saying we increased the effective thrust as a minimum by 50% and quite possibly as much as 100% over our first prototype. We do not have precise measurements of this, and this is based upon our observations of the ability to move the boat sideways which would of course have a proportional relationship to the thrust provided by the thrust assembly.

I, Donald Bruce McDugle, hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and, further, that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application thereon.

EXECUTED this 23 day of August, 2004.

Donald Bruce McDugle

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